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THE FAUNAL AFFINITIES OF THE PRAIRIE REGION OF CENTRAL NORTH AMERICA

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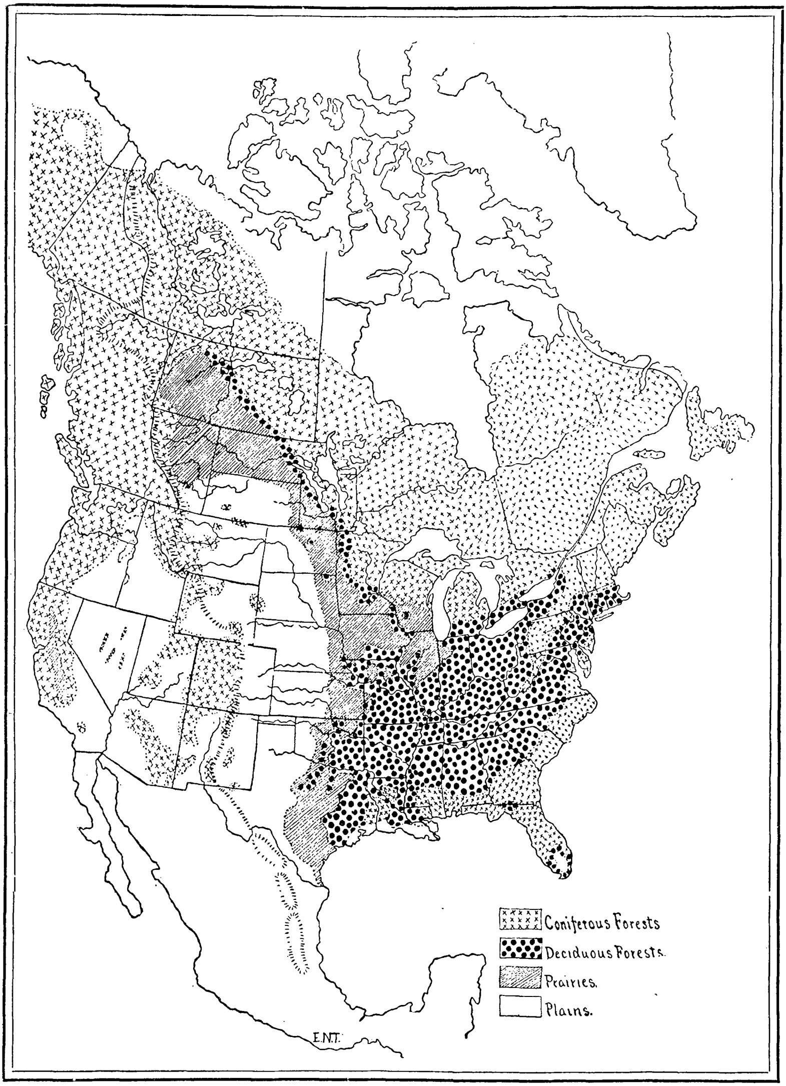
THOSE who are acquainted with the literature of the field zoology of North America are familiar with the fact, that, from the time of the Pacific Railroad surveys, naturalists have noted that there are in North America several well-defined biological regions. These have been pointed out at various times by Allen, Cope, Merriam and others, and the fauna of each has been more or less investigated. Of late years there has been a tendency among biologists to discredit this kind of work, owing to the apparent tendency of some naturalists to consider the mapping of these regions as an end in itself, but it seems to me that this work, if done properly, has a very real value.

If it is true that the formation of species among vertebrates is orthogenetic, as Whitman (1907) holds for pigeons, and I have found to be true in the garter-snakes (Ruthven, 1908), and these species are associated with different sets of environmental conditions, as seems to be the case, for example, in the genera Leptinotarsa (Tower, 1906) and Thamnophis (Ruthven, 1908), it is manifestly of importance that these areas of characterization be determined. Certain it is that the areas of characterization will not be the same for all animals, for the reaction of any form to any set of environmental conditions depends fundamentally upon the constitution of the animal, and this is a variable. On the other hand, in the case of terrestrial vertebrates, there would seem to be enough similarity in their mode of life to render



Map showing the location of the plains, prairie, and eastern forest regions of North America. (From Transeau, after Sargent.)

them subject to the same general conditions; a fact that is borne out by faunal studies. For example, we have forms of birds, reptiles and mammals characteristic of the plains region, others characteristic of the southeastern deciduous forest region, and still others characteristic of the northeastern coniferous forest region, etc. For these reasons it seems to me that careful faunal studies must contribute very materially to our knowledge of the affinities and relationships of forms.

Among the biotic regions that have been recognized in North America, the prairie region is one of the most interesting. It consists in general of a narrow zone separating the eastern forest from the semi-arid plains, as shown on the accompanying map. In Iowa, Illinois, northern Missouri, and southern Minnesota and Wisconsin, it widens into a wedge that extends to the western boundary of Indiana. Pound and Clements (1900), Transeau (1905), Bray (1901) and Sargent (1884) have shown that both the environmental conditions and the flora of this region are characteristic, but so far as I know the vertebrate life has never, as a whole, received examination.

During the past summer, the writer conducted an expedition[1] for the University Museum, University of Michigan, to northwestern Iowa, for the purpose of investigating the fauna of that region. The collections obtained by this expedition furnished a very representative series of the vertebrates of the prairie region, and a careful study of the data seems to lead to three fundamental conclusions.

1. *The peculiar environmental conditions of the prairie region have an effect upon the vertebrate fauna.* This is shown by the fact that many groups become modified as they enter this region from the adjoining ones. Note the following examples:

(*a*) I have elsewhere shown that as the snake *Thamnophis radix* (B. & G.) enters the prairie region from the plains it becomes strikingly dwarfed.

(*b*) Again, many of the plains forms are replaced in the prairie region by nearly related forms whose principal range is to the eastward of the prairie, as shown by the following instances:

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[1] Detailed reports will appear upon the results of this trip.

PLAINS	PRAIRIE
Western yellow-thoat, *Geothlypis trichas occidentalis* Brewst.	Northern yellow-thoat *Geothlypsis trichas brachidactyla* (Swains.).
Pallid horned lark, *Otocoris alpestris leucolaema* (Coues).	Prairie horned lark, *Otocoris alpestris practicola* Hensh.
Western grasshopper sparrow, *Coturniculus savannarum bimaculatus* (Swains.).	Grasshopper sparrow, *Coturniculus savannarum passerinus* (Wils.).
Sennett nighthawk, *Chordeiles virginianus sennetti* (Coues).	Nighthawk, *Chordeiles virginianus* (Gmel.).
Pocket gopher, *Geomys lutescens* Merriam.	Pocket gopher, *Geomys bursarius* (Shaw).

(*c*) Furthermore many of the forms from the eastern forest region are here replaced by others whose principal range is to the westward of the prairie. The following examples may be noted:

EASTERN FOREST	PRAIRIE
Garter-snake, *Thamnophis sirtalis* (L.).	Red-sided garter-snake, *Thamnophis sirtalis parietalis* (Say).[2]
Blue-tailed skink, *Eumeces fasciatus* (L.).	Northern blue-tailed skink, *Eumeces septentrionalis* (Baird).
Long-billed marsh wren, *Telmatodytes palustris* (Wils.).	Prairie marsh wren, *Telmatodytes palustris iliacus* Ridg.
Chickadee, *Parus atricapillus* Linn.	Long-tailed chickadee, *Parus atricapillus septentrionalis* (Harris).
Meadow lark, *Sturnella magna* (Linn.).	Western meadow lark, *Sturnella magna neglecta* (Aud.).
House wren, *Troglodytes aëdon* Viell.	Western house wren, *Troglodytes aëdon parkmani* (Aud.).

2. *Most of the forms which inhabit the prairie region either extend also into the eastern forest region or into the plains region, or rarely both, few*[3] *being confined to*

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[2] It is uncertain just which one of the Hog-nosed Snakes (*Heterodon*) is to be considered characteristic of the prairie region. *H. platyrhinus* Latr. has been recorded from the prairie region, and even from the plains, but the museum expedition only found *H. nasicus* B. & G. in western Iowa (Clay and Palo Alto Counties). The question can only be settled by detailed collecting and by the careful determination of the specimens.

[3] The pocket gopher, *Geomys bursarius* (Shaw), and the prairie hen, *Tympanuchus americanus* (Reich.), are exceptions to this rule, both being principally confined to the prairie region.

the prairie region. This composite nature of the prairie fauna may be seen by comparing the two lists above.

3. *There is a great difference in the extent to which the forms of eastern North America push westward, or the plains forms push eastward, into the prairie region before becoming modified or checked.* Among the plains forms the Arkansas kingbird (*Tyrannus verticalis* Say) and the western hog-nosed snake (*Heterodon nasicus* B. & G.) only extend into the western part of Iowa, Palo Alto County, being apparently the most eastern authentic locality recorded,[4] but the yellow-headed blackbird, *Xanthocephalus xanthocephalus* (Bonap.), and red-sided garter-snake, *Thamnophis sirtalis parietalis* (Say), extend into Illinois. Again, the prairie hare (*Lepus campestris* Bach.) and others only enter the western part of Iowa, while the Franklin spermophile, *Citellus franklini* (Sabine), penetrates eastward as far as Illinois, and the thirteen-lined spermophile, *Citellus tridecemlineatus* (Mitch.), extends to southeastern Michigan.[5]

Among the eastern forest forms, the Michigan mouse, *Peromyscus michiganensis* (Aud. & Bach.), cotton-tail, *Sylvilagus floridanus mearnsi* Allen, green snake, *Liopeltis vernalis* (De Kay), bluebird, *Sialia sialis* (Linn.), Baltimore oriole, *Icterus galbula* (Linn.), orchard oriole, *Icterus spurius* (Linn.), bob-white, *Colinus virginianus* (Linn.), swamp sparrow, *Melospiza georgiana* (Latr.), and others extend westward at least as far as the western margin of the prairie, while the Butler garter-snake, *Thamnophis butleri* (Cope), garter-snake, *Thamnophis sirtalis* (L.), meadow lark, *Sturnella magna* (L.), long-billed marsh wren, *Telmatodytes palustris* (Wils.) and many other forms, only enter its eastern border.

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[4] The University expedition found the Arkansas Kingbird in Palo Alto County, and *Heterodon nasicus* on the line between Clay and Palo Alto Counties.

[5] Mr. P. A. Traverner has recently presented to the University Museum a specimen of *Citellus tridecemlineatus* (Mitch.) from Port Huron, Michigan, and Mr. N. A. Wood, of the University Museum, has observed a specimen in Oscoda County.

These facts, it seems to me, point strongly to the conclusion, that, as far as terrestrial vertebrates are concerned, the intermediate character of the environmental conditions makes of the prairie region an extensive area of transition between the plains and eastern forest regions, but that the environmental conditions are not either intensive or extensive enough to mold the forms into a peculiar fauna.

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